CLAIMS

1. A method of fabricating a semiconductor device comprising the steps of:

depositing multiple layers of semiconductor material on a supporting substrate to form the semiconductor device; and

depositing at least one layer of the multiple layers in the presence of a surfactant.

2. The method of claim 1 wherein the surfactant is chosen from the group consisting of antimony, indium, bismuth and thallium.

3. The method of claim 1 wherein the surfactant and semiconductor material is in a flux ratio in a range of approximately from 0.0001 to 0.1.

4. The method of claim 1 wherein the semiconductor material includes aluminum and gallium.

5. The method of claim 4 wherein the surfactant includes antimony.

6. The method of claim 5 wherein the at least one layer is grown with the supporting substrate at a temperature in a range from approximately 400 °C to 800 °C.

7. The method of claim 6 wherein the flux ratio is in a range of approximately 0.0001 to 0.1.

8. The method of claim 1 wherein the semiconductor device includes at least one of a high electron mobility transistor, a vertical cavity surface emitting laser, an edge emitting laser, a heterostructure bipolar transistor, a resonant tunneling diode, and the like.

9. A method of fabricating a semiconductor laser comprising the steps of:

depositing a plurality of layers of semiconductor material including at least one active area with opposed major surfaces and a cladding layer adjacent each opposed major surface; and

at least one of the active area and the cladding layers being deposited in the presence of a surfactant.

10. The method of claim 9 wherein the surfactant is chosen from the group consisting of antimony, indium, bismuth and thallium.

11. The method of claim 9 wherein the surfactant and semiconductor material is in a flux ratio in a range of approximately from 0.0001 to 0.1.

12. The method of claim 9 wherein the semiconductor material includes aluminum and gallium.

13. The method of claim 12 wherein the surfactant includes antimony.

14. The method of claim 13 wherein the at least one layer is grown with the supporting substrate at a temperature in a range from approximately 400 °C to 800 °C.

15. The method of claim 14 wherein the flux ratio is in a range of approximately 0.0001 to 0.1.

16. A semiconductor device comprising:

a plurality of layers of semiconductor material epitaxially grown one on another; and

at least one of the semiconductor layers including a surfactant with the semiconductor material.

17. A semiconductor device as claimed in claim 16 wherein the surfactant is chosen from the group consisting of antimony, indium, bismuth and thallium.

18. A semiconductor device as claimed in claim 17 wherein the surfactant and semiconductor material are in a flux ratio in a range of approximately from 0.0001 to 0.1.

19. A semiconductor device as claimed in claim 16 wherein the semiconductor material includes one of aluminum and gallium.

20. A semiconductor device as claimed in claim 19 wherein the surfactant includes antimony.

21. A semiconductor device as claimed in claim 20 wherein the flux ratio is in a range of approximately 0.0001 to 0.1.

22. A semiconductor device as claimed in claim 16 wherein the semiconductor device includes at least one of a high electron mobility transistor, a vertical cavity surface emitting laser, an edge emitting laser, a heterostructure bipolar transistor, a resonant tunneling diode, and the like.